ISSN 0228-4111

NEWSLETTER OF THE LONDON CHAPTER,
ONTARIO ARCHAEOLOGICAL SOCIETY
c/o Museum of Ontario Archaeology
1600 Attawandaron Road, London, ON N6G 3M6

January - March 2016 16-01, 16-02 & 16-03

The next London Chapter event is our ***Annual Picnic***! As in past years, we are holding it in conjunction with the ***Annual Archaeology Day*** at the ***Longwoods Conservation Area*** just west of Delaware, on **Sunday July 16th from ca. 11:00 AM to 4:00 PM** (see inside this issue for details and our website at: www.ssc.uwo.ca/assoc/oas/. 2).

The next London Chapter meeting will be held on Thursday, September 14, 2017 at the Museum of Ontario Archaeology staring at 7:30 PM. The speaker will be Dana Poulton, of D. R. Poulton and Associates, who will speak on research carried out with Michael Spence and Kathy Gruspier in a presentation entitled: ***The Archaeological Assessment of the Site of the Flight 621 Disaster (AkGw-304), City of Brampton, Ontario***. An out of the ordinary archaeological topic to be sure!

Speaker's Night is held the 2nd Thursday of each month (January to April and September to December) at the Museum of Ontario Archaeology, 1600 Attawandaron Road, near the corner of Wonderland & Fanshawe Park Road, in the northwest part of the city. The meeting starts at 7:30 pm. Doors open at 7:00 PM and as usual there will be free juice and cookies!

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ANNUAL RATES

Student	$15.00
Individual	$18.00
Institutional	$21.00
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Some Chapter News!!

As always, we are behind schedule with releasing issues of ***Kewa*** but this three issue length first release of 2016(!!!) will make a dent in that backlog. Still, we obviously need a lot more articles and of course, eventually even Chris Ellis and Mike Spence will run out of things to write about!!! So for the umpteenth time we make a plea for more articles. Surely there must be licence reports, or sections thereof, that can be easily converted to papers (as in two of the articles in this issue).

Meanwhile, and unlike ***Kewa*** releases, the London Chapter is very active on several fronts. Of primary note, the Chapter is commencing a research project this summer that will provide members and guests with the opportunity to walk fields and hopefully participate in an excavation. The project will be led by Shari Prowse and will be focusing on the Lake Whittaker area just southeast of London. The long range goal is to try and trace the community movement pattern of a group of Iroquoian people who lived in that area in the 15th century. This initiative will restart Chapter research from over 30 years ago in the same area that was focused on the Harrietsville Site. We have already located and mapped one site in the area and identified one new one. This month we expect to be doing more survey in the area. Once we have accumulated sufficient material we will be holding washing and cataloging events to get the material ready for analysis. The accompanying picture shows a projectile point recovered in the survey. If you want to participate in this project contact Shari Prowse at archaeologist@rogers.com and let her know your interests and availability.

Did you know the Chapter is now 40 years old? At the last chapter speaker night, two of our original charter members, Stan Wortner and Mike Spence, were present. To celebrate this milestone, join us at the Chapter Picnic, July 16, 2017, at the Longwoods Road Conservation area at noon. Admission is free for Chapter members. Chapter members will again be identifying artifacts for the general public and there will be other activities taking place. Speaker nights are over now for the summer and will start again on September 14th at the Museum of Ontario Archaeology (see cover); remember our new earlier start time of 7:30 PM.

The OAS Board has approved the joint submission of the London Chapter and the Windsor Chapter to organize the 2018 OAS Symposium, which will be held at the Chatham Kent convention centre Nov 9-11, 2018. A primary theme of the symposium will be the archaeology of black history/communities in Ontario (and "no" we do not have a catchy theme title yet) but we will have room for many other contributed papers. We are looking forward to again be working with our old friends at the Windsor Chapter to host this Symposium.

A Hi-Lo Point from Near Sylvan, Ontario

By James Keron and Chris Ellis

Introduction

We report here on a find of a Hi-Lo point from near Sylvan, Ontario, in the Ausable River drainage. The point was found while surveying areas of the Ausable valley looking for Broad Point Late Archaic sites, as part of the ongoing research at the Late Archaic Davidson site (see Eastaugh et al. 2013; Ellis et al. 2014a, 2014b, 2015; Keron 2015; Malleau 2015). Several Broad Point sites are known (e.g., Adder Orchard and Sadler) and have been registered in the area. The original plan was to visit some of these sites and if possible do a Controlled Surface Pickup to determine size and distribution as well as look for additional sites some of which we had heard of through local folklore. Due to other commitments we did not accomplish as much of survey as we would have liked but did survey one area south of the Davidson site where tradition placed a Broadpoint site at the back of the field. An Early Paleoindian site, as suggested by artifacts on Collingwood/Fossil Hill chert, was suggested to be at the edge of the same field. Neither of these occupations was verified in our examination but we did recover a Late Paleoindian Hi-Lo projectile point. This location was named the Deller-x Site after the current property owner and the Borden Number is AgHk-238. This report describes this projectile point and its location.

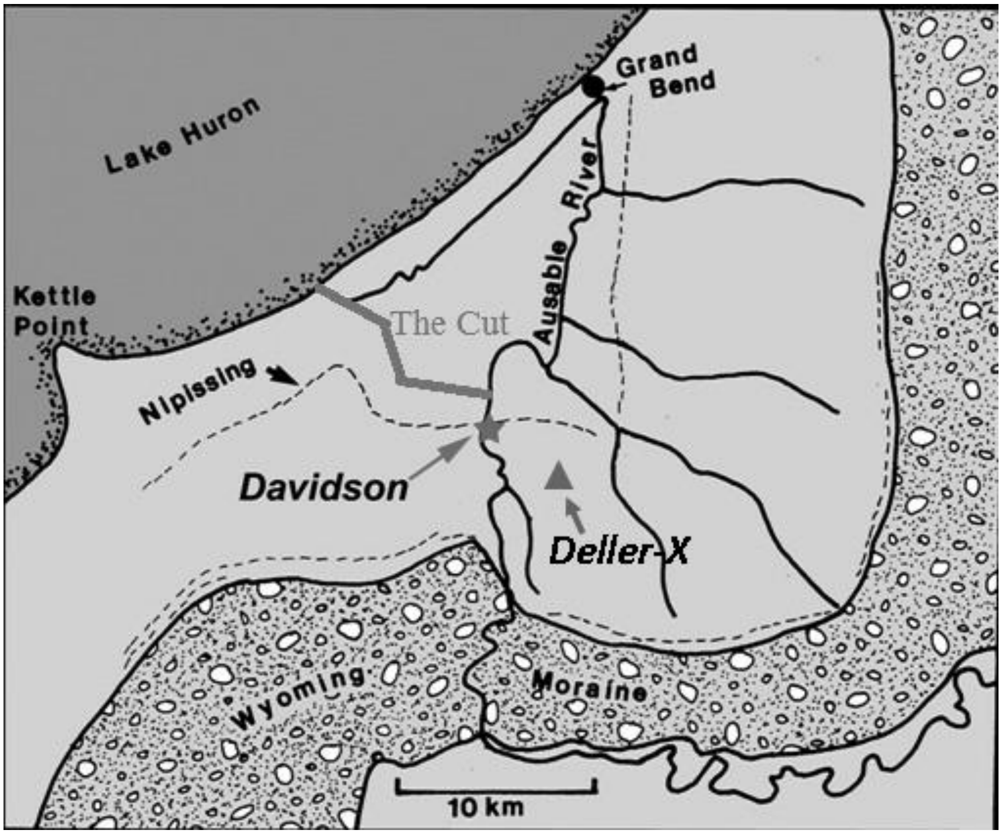

Figure 1: Location of Deller-X (AgHk-238) Hi-Lo Find.

AgHk-238 Site Location and Fieldwork

The Deller-x site is located on Concession 21 of West Williams Township in a field (Figure 1) near the village of Sylvan. The site is located approximately 2km east of the Ausable River and just east of a small unnamed tributary which flows to the north and west before entering the Ausable near an old railway bridge. Land to the north along this tributary is swampy. The topography of the site is rolling. The site is north of the Wyoming Moraine in an area of the province which Chapman and Putnam (1984) call the "Huron Slope". This area is drained by the north flowing Ausable River, which enters the Thedford Marsh near the Davidson site and eventually drains into Lake Huron just west of Grand Bend.

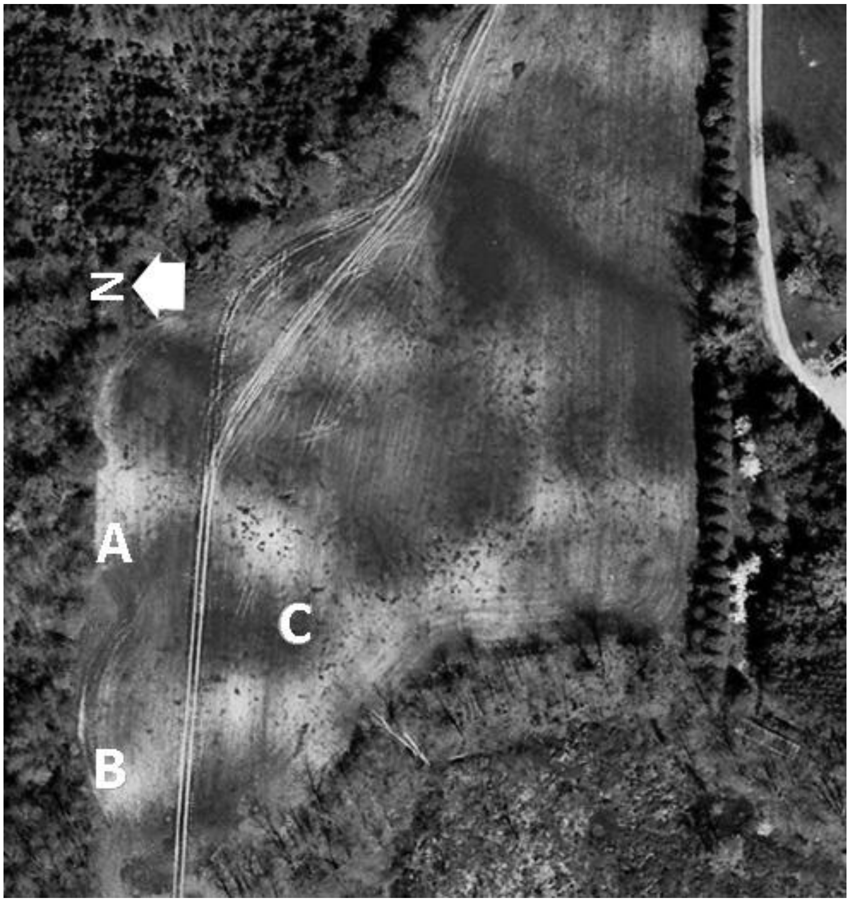

Figure 2: Air Photo of Deller X Site. C is Hi-Lo point location on higher ridge.

As noted the site was visited by the authors and Ed Eastaugh in the fall of 2011 with the express purpose of investigating a Broad Point component reported to be located at the back of the field. We did not use a standard transect procedure but proceeded down the north edge of the field towards the back corner where the site had been reported. There was no sign of the possible Early Paleo-indian site (Figure 2A) and only a few flakes and no diagnostic artifacts were observed in the reported location of the Broad Point site (Figure 2: Area B). We then proceeded along the western edge of the field in a southeasterly direction. On the highest point of the ridge a Late Paleoindian Hi-Lo point (Fitting 1963a, 1963b) was discovered (Figure 2: Area C). A flag was planted at the find spot and the location was recorded at the time with a compass by taking sights on several prominent land features (e.g., Figure 3). Later, the site was visited again and the location relocated with the compass and the latitude and longitude was recorded using the GPS on an iPhone 5s. Three or four flakes were observed in the area of the find but it is uncertain whether or not these relate to the Paleoindian occupation. These flakes were left in place.

The projectile point (Figures 4 and 5) is manufactured from Onondaga chert, which is unusual but not unknown in the Hi-Lo complex in southern Ontario where the primary preferred stone types are Haldimand and Kettle Point Chert (Ellis 2004; Browne 2016). Onondaga and Bayport chert points are also found but are not the preferred types. Onondaga is actually most commonly used in areas east of the Grand River and extending into western New York state. However it is actually not much used elsewhere, including even the areas in the lower Grand River area where Onondaga outcrops occur (see Browne 2016).

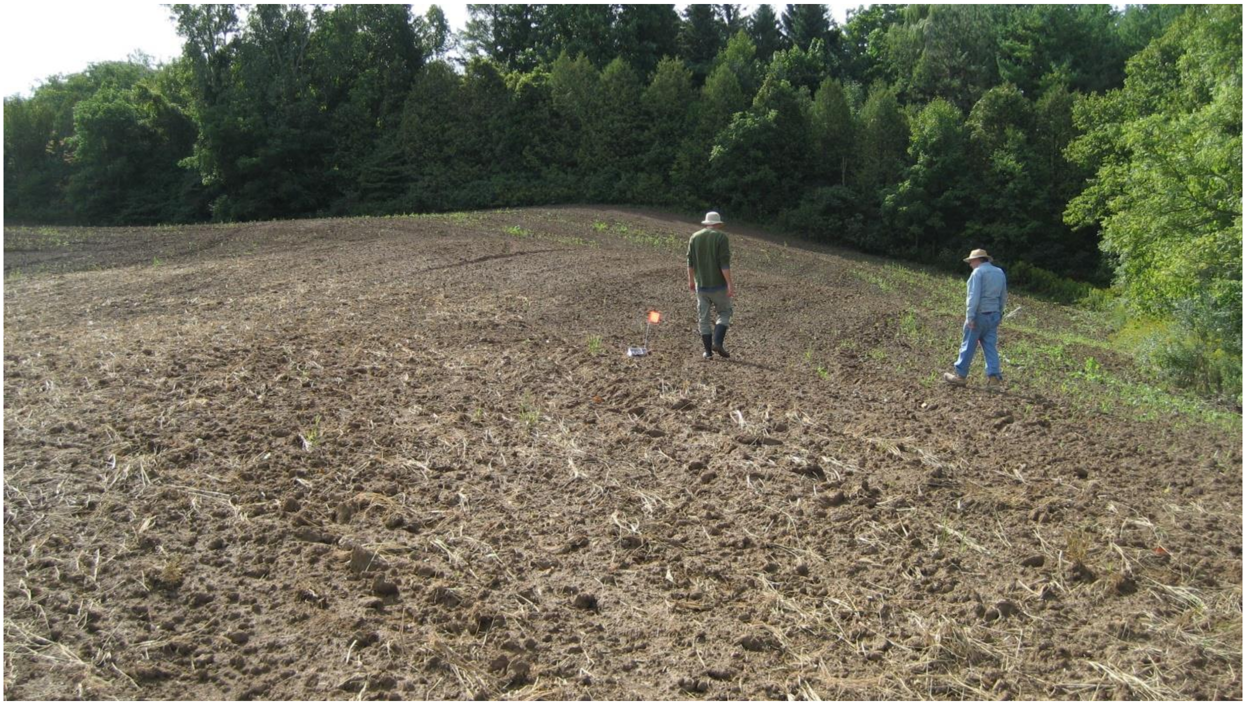

Figure 3: View to the East from Find Spot Located at Flag (108 degrees magnetic).

The Sylvan point displays an impact fracture on the distal end on both the dorsal and ventral surfaces with at least two impact fracture flakes removed from both surfaces of the tip suggesting, as does comparable data from other sites (Ellis 2004; Ellis and Deller 2013), that these items definitely served as projectiles. Hi-Lo points typically have some degree of alternate edge beveling extending along the side edges that suggests non-projectile use as well and the Sylvan point is slightly beveled in this manner. The point has incipient side-notches at the base which may be indicative of a late placement in the Hi-Lo sequence (Ellis 2004). Ellis (2004) has proposed that there are three subtypes within the H-Lo complex with the side-notched variety being the latest and suggesting a date shortly after 10,000 RCYBP. It is notable that Browne (2016) found that the side-notched Hi-Lo points were more often on Kettle Point chert than presumed earlier varieties. It is possible that Kettle Point and adjacent more northern areas such as where Deller-X is located were used predominantly later in time as earlier the general location including the chert source may have been used earlier predominantly by other groups making different point forms or the "plano lanceolates" that resemble Agate Basin and Hell Gap forms of the west. Those lanceolates are common in the more northern areas and apparently overlap somewhat in time with the more southerly concentrated Hi-Lo finds (see Dibb 2004; Ellis and Deller 1986, 1990:61-62; Stewart 1984).

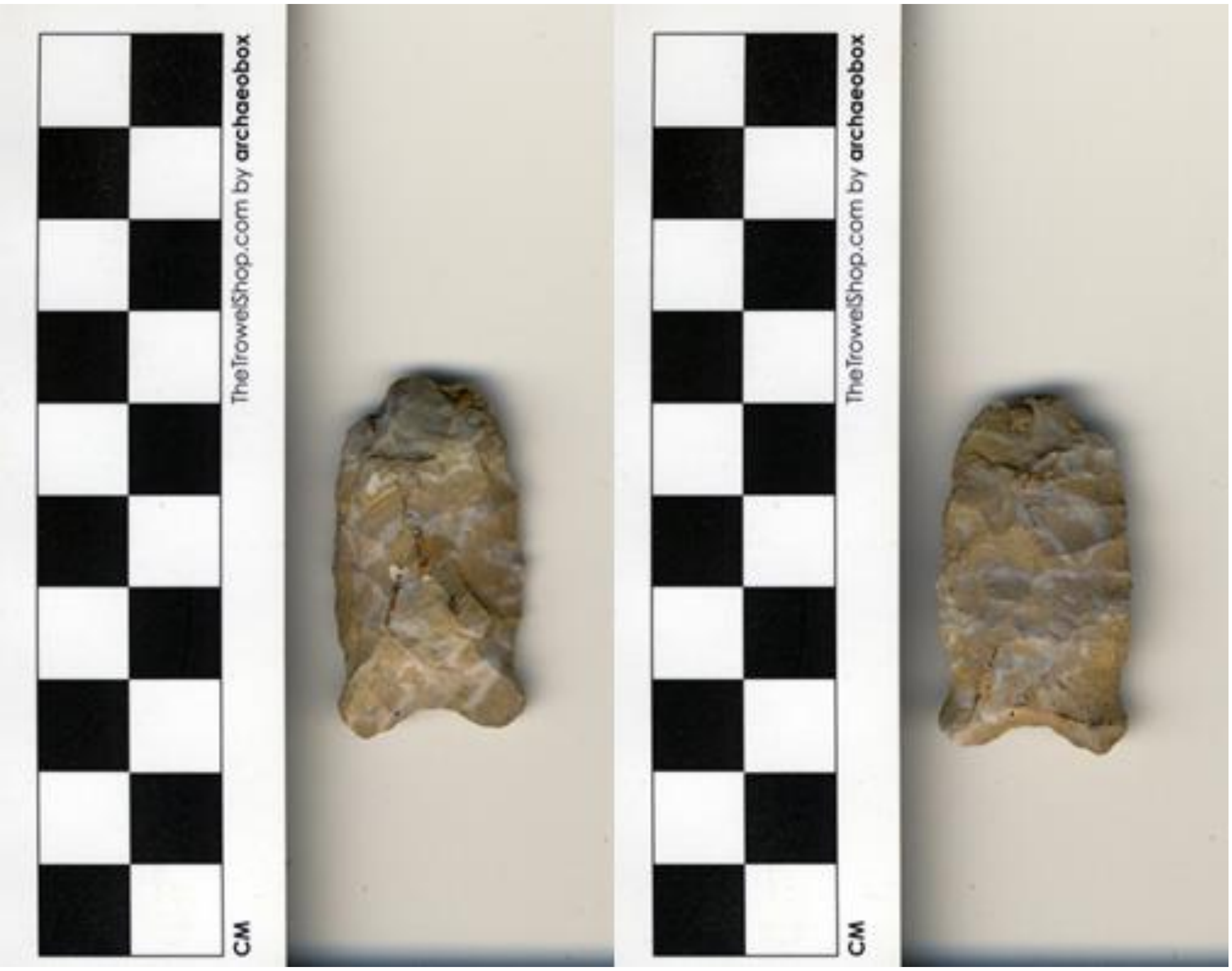
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Figure 4: Onondaga Chert Hi-Lo Point from Deller-X Site.

The basal concavity and the two incipient side-notches on the Deller-X point are heavily ground, which is again typical of Hi-Lo projectile points. The length is 39mm, the maximum width is 21mm and the point as is usual for the type, is quite thick at 8mm. The notch width is 18mm and the depth of the basal concavity is a typically shallow 3mm. There is a portion of the original flake blank surface visible at the midpoint of the dorsal surface but most of this surface is worked bifacially. Remnant unflaked surfaces of the small original blank on which points were made is quite common (Ellis and Deller 2013). Flaking is from the lateral edges except for the flakes removed to create the basal concavity. There is actually not much in the way of basal thinning flake removals, which is not typical. Yet notably, on the second face shown, a larger flake was removed from the apex of the notch at one side that extended across the surface of the point close to the base or from right to left in the photograph. Thinning of the base in this manner from one lateral edge has been noted on other Hi-Lo point examples (Ellis and Deller 1982:10).

In all probability the point tip here was damaged while hunting. It could be an isolated loss but given the rarity of these point forms overall and that the chances of making a find of an isolated Hi-Lo or any Paleoindian point loss on the vast southern Ontario landscape is very low, discard at a briefly used campsite may be more likely. However, future collections will need to be done at the site to evaluate this suggestion.

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Oral Pathology and Subsistence in the Younge Phase, Western Basin Tradition

By Michael W. Spence

The recent excavation of a number of Younge phase sites (800–1200 AD) in southwestern Ontario has provided evidence on the skeletal health of Western Basin peoples (e.g. Spence et al. 2014). Less well understood is their dental health and its relationship to their subsistence system. Following below, then, are descriptions (admittedly rather boring) of the oral health of the skeletons and its implications for their overall health and their subsistence system.

Bingo Village

Bingo Village was a palisaded village of the latter part of the Younge phase, one of a cluster of villages in the area around the modern village of Arkona (Spence and George 2016). A considerable number of mortuary features were excavated there and their contents briefly studied before reburial.

Feature 98. This was the sorted deposit of an individual 13–16 years old. The only teeth recovered were four permanent maxillary teeth: the left incisors and canine and the right lateral incisor. There are chips on the occlusal edges of the three incisors but not the canine, and caries are absent.

Feature 164. This large secondary burial held the partial skeletons of seven individuals (A–G). Although the cranium and mandible of the adult (A, male, 30–45 years) are absent, levels of wear in some of the recovered teeth show that they are probably from his maxilla and mandible. These include all four lower incisors, three canines, and the upper left first and second molars (ULM1, ULM2). The canines are worn almost to the root. None of the teeth has a caries but one incisor and one canine have chips.

The maxilla of cranium #2, the teenager (B, male, 15–17 years), shows postmortem loss of all the incisors, canines, first premolars and the left second premolar (ULPM2). They were not present in F164. Still present in the maxilla are the right second premolar (URPM2) and both first and second molars. There are no chips or caries.

Cranium #1 (C, 11.0-12.5 years old) shows postmortem loss of the maxillary permanent incisors, canines, first premolars and right second premolar. They were not found in the feature. The ULPM2 had been lost before death, with resorption at the site. The permanent first molars had erupted but have no chips or caries.

The maxilla of cranium #3 (E, 7.5-8.5 years old) shows the eruption and functioning of all the deciduous teeth and of the permanent first molars. However, the deciduous incisors and canines had been lost postmortem and were not present in the pit. The two deciduous molars and permanent first molar are present on the left side. On the right the deciduous molars had both been lost before death, leaving a large abscess pocket, but the permanent URM1 is still in place. None of the surviving molars have chips, but there is a large caries in the occlusal surface of the deciduous left first molar (dULM1). Also, a deciduous mandibular left second molar (dLLM2) from just east of crania #2 and #3 is probably from this individual. It has a large caries but no chips.

Besides these assigned teeth, there were several loose teeth in the deposit that cannot be associated with any particular individual. Maxillary teeth include two lateral incisors (the left and right of the same person), a canine and a premolar. None of these are from B, C or E, and none have chips or caries. Loose mandibular teeth are a canine, two premolars, and three left molars. The only pathology is a large caries in one of the molars.

Feature 207. This was the primary burial of a woman in her mid to late twenties. The ULM1 had been lost before death and the adjacent second molar has tilted mesially into the space left there. The URM1 has a large caries that has destroyed the lingual half of the crown, and there is an abscess at the site. The mandibular left first molar had been lost shortly before death. None of the teeth shows chipping.

Feature 218. This was another primary burial of a young woman, about 25–35 years old. All teeth, including the third molars, are present on the maxilla except the URI1, which was lost shortly before death. There are no caries on the remaining teeth but the right lateral incisor is chipped. On the mandible all the incisors, canines and premolars are present, with no chips or caries. However, all six of the molars had been lost before death. Remaining roots suggest that caries was responsible for the loss of at least one of them.

Feature 352. This secondary burial included a woman of 35–60 years and a child of 6–7 years. All of the child's deciduous teeth and permanent first molars had erupted fully and were present. There are no caries or antemortem loss, but chips are present on the dURM1, dLLM2, and both mandibular deciduous right molars.

The adult maxilla has all teeth present, including the third molars. The ULM1, however, is represented only by its roots. The crown had been completely destroyed by caries. There is also a caries of moderate size in the occlusal surface of URM3. There are chips off the crowns of ULI1 and ULPM1. On the mandible all six molars had been lost before death and the alveolus had resorbed. There are no caries in the incisors, canines or premolars, but a chip is present on LLI1.

Feature 590. This sorted deposit contained two teenagers. None of the eight recovered teeth has caries or chips. This is not surprising in view of the youth of both individuals.

Oral Health. Isotopic data from another site in the Arkona region indicate that the local Younge phase people consumed a high level of maize (Spence et al. 2010; see also Dewar et al. 2010; Watts et al. 2011). This is usually reflected in the dentition by high levels of caries and relatively low levels of trauma like chips and fractures (Patterson 1984). Maize is a high carbohydrate food, and in Ontario Native societies was processed and served in the form of soups, broths and stews that tend to coat the teeth. It was thus a very cariogenic staple. Hunter-gatherer diets tend to have higher levels of trauma but relatively few caries since the typical foods were often hard (roots, nuts, hard seeds, bones) and less thoroughly processed before consumption.

Dental pathology was recorded for all of the observable teeth, although many of the mortuary features included few or none. It is known that the incidence of dental pathology varies with sex, age, diet, and the location and structure of the tooth. Unfortunately, the Bingo Village sample is too small to investigate any of these variables in detail. Data are available for only 4 adults, 4 teenagers and 3 children, and most of these had incomplete dentitions because of postmortem losses that had occurred during the mortuary proceedings.

The mandible and maxilla are combined here, and individual teeth that share similar oral environments are merged into larger categories (Table 1). Some distinctions that would probably have proved to be significant in a larger sample are lost here, but the small size of the series leaves no alternative. For example, levels of pathology normally differ among the three molars but there are too few examples to examine this trend.

Three age categories have been defined for this analysis: permanent teeth of adults (n=4 adults), permanent teeth of teenagers (n=4), and deciduous teeth of juveniles (ages 7-9 years, n=2). There are also three tooth categories: 1) incisors and canines; 2) premolars; and 3) molars. The incisors and canines are anterior teeth and subject to different stressors than the posterior teeth, the molars. The premolars, a tooth category that occurs only in the permanent dentition, are intermediate with respect to stress.

There are no dental fractures but chipping is present (Table 1). In the permanent teeth it is most common in the anterior teeth, with only one case in the premolars and none in the molars. In the deciduous teeth, on the other hand, chipping is confined to the molars, where there are three cases on first deciduous molars and one on a second molar. This suggests that children may not have consumed the same foods, or foods prepared in the same manner, as adults. It was not just a matter of the smaller jaws of children; other Late Woodland series do not show this reversal in chipping location between deciduous and permanent teeth (Patterson 1984: table 9.22).

Caries are confined entirely to the molars on both the permanent and deciduous teeth. Their frequency is not high, 12.5% in the adult molars, but the very high incidence of antemortem loss in the adult molars (36.8%) must be considered too. Most or all of it was probably due to caries. Two of the adult women (F218, F352A) have total antemortem loss of all their mandibular molars with subsequent resorption of the alveolus. It is interesting that another Younge phase woman in the nearby Location 9 site (Spence et al. 2010) had also suffered the antemortem loss of all her mandibular molars (see below).

Caries, then, was a serious problem, focussed particularly on the lower posterior teeth. This is not surprising in a population with a high dependence on maize. The incidence of chipping is moderate. At 16.7% in the anterior teeth it is slightly higher than in most Ontario maize-dependent societies (Patterson 1984: table 9.22). This indicates that there was still significant consumption of less thoroughly processed wild foods.

Table 1: Dental Pathology of Bingo Village.*

	Incisors, Canines	Premolars	Molars
Permanent teeth, adults			
antemortem loss	1/43	0/22	14/38
chipping	5/42	1/22	0/24
caries	0/42	0/22	3/24
Permanent teeth, teenagers			
antemortem loss	0/11	0/9	0/4
chipping	3/6	0/6	0/2
caries	0/6	0/6	0/2
Deciduous teeth, juveniles 6–9 yrs.			
antemortem loss	0/18		2/12
chipping	0/12		2/11
caries	0/12		2/11

* mandible and maxilla combined

Location 9

The only burial found in Location 9, another Younge phase site of the Arkona cluster, was the secondary burial of a woman of 30–50 years who suffered from a treponemal infection, probably some form of endemic syphilis (Spence et al. 2010).

No trace of the maxilla had survived topsoil clearing in the archaeological work but two loose maxillary teeth, a canine and premolar, were recovered. Neither has caries. The canine has two marked hypoplasia lines, 3.44 and 5.27 mm above the cementum-enamel junction. Applying Wright’s formula (1997: table 1) these suggest episodes of biological stress at about 5 and 4.4

years of age respectively. The episodes may have been due to malnutrition, an infection or a traumatic event, but are somewhat too late in life to reflect weaning problems.

The mandible was recovered and shows antemortem loss of all six molar teeth, with closure and resorption of the alveolus. There are no abscesses. The other teeth were lost postmortem, except for the two right incisors. These show no caries but do have severe wear, reaching the root. The wear is much greater than would be expected from the attrition visible in the two maxillary teeth. It is also very steeply angled, creating a deep V-shaped notch between the two teeth. It seems likely that it is the result of using the teeth in some regular task.

Roffelsen

The Roffelsen site was an early Younge phase mortuary site with a single burial (feature 59) holding seven individuals (A–G) (Spence et al. 2014). Individual G was an infant, with no erupted teeth.

Individual A. A's teeth show heavy wear, commensurate with his age of 50–70 years. The crowns of the anterior teeth have been largely destroyed by attrition. All four maxillary incisors have suffered wear down to their roots, which then functioned as the occlusal surfaces.

All mandibular teeth are present except for LRM1, which had been lost antemortem, the site now resorbed. There are no caries or abscesses in the other teeth. Hypoplasia is also absent, but the heavy attrition obscures observation on the more vulnerable anterior teeth.

The maxilla, in contrast, displays extensive evidence of infection. Caries have destroyed the crowns of ULC and all four premolars, and URC has a small caries developing on the buccal surface of the crown. The URM2 had been lost antemortem, with closure and resorption of its site. Apical abscesses are present at the sites of six teeth: both canines, both left premolars, URPM2 and URM1. The alveolus supporting URM3 and ULM1-ULM3 was too fragmented for observation, and none of those teeth were recovered. No observations for hypoplasia were possible on the maxillary teeth.

Individual B. B was a child of 6–8 years. On the mandible the dLRC and all the deciduous molars were still present and functioning, but the dLLC had been lost. The permanent incisors, first premolars and first molars had erupted. The maxillary deciduous canines and second molars were erupted and present, as were the permanent URI1, both first premolars and both first molars. However, the permanent ULI1 had not yet completed eruption and the permanent ULI2 was immediately behind it instead of in its normal position lateral to it.

Caries have affected five mandibular and five maxillary teeth. On the mandibles, the crowns of both deciduous and the permanent right first molars have been largely destroyed, with an apical abscess developing at the site of the permanent molar. The dLRM2 has a small caries on the occlusal surface. The permanent LLM1 has two small caries, one on the occlusal surface and the other on the buccal face.

Both maxillary first premolars have caries on their buccal faces. The dULC has three, all developing on the lingual side. Both permanent first molars also have caries. There are no abscesses.

Individual C. All the deciduous teeth had fully formed and erupted, but none of the permanent teeth had erupted. Long bone dimensions and dental development suggest an age of 3-4 years.

None of the deciduous teeth or the permanent maxillary central incisors has hypoplasia lines. Occlusal caries have destroyed much of the crowns of both deciduous mandibular first molars. There are also caries starting on the labial surfaces of both deciduous maxillary lateral incisors.

Individual D. All the deciduous teeth (but none of the permanent teeth) had erupted. Their development supports an age range of 1.5–1.8 years. There are no caries or other oral pathology, and no hypoplasia.

Individual E. E is also 1.5–1.8 years of age. Only some of the deciduous teeth were recovered: the maxillary and mandibular left canines and molars. None have either caries or hypoplasia.

Individual F. F was a male teenager, 18–19 years old. The third molars have erupted and reached the occlusal plane but show no attrition, other than some very light wear on the cusps of LRM3.

Two teeth, LLPM1 and LLM2, have small caries. There are no abscesses. Some of the mandibular teeth have hypoplasia lines, with three on each of the canines. Measured and interpreted with the formulae of Wright (1997: Table 1) they suggest several episodes of stress between the ages of three and six, but concentrated primarily in the fourth year of life.

Seven maxillary teeth were not in their sockets: ULI2, URI1-C, URPM2, URM2-M3. Only URC was found, lying by the anterior part of the mandible some 15 cm from its socket. The sockets are sharp-edged, indicating postmortem loss. Also, they were packed with hard soil, indicating that the loss was not recent. The recovered canine and two other teeth still *in situ*, ULC and ULPM1, have postmortem damage to their crowns, but the exposed enamel and dentin surfaces have dirt caked on them. Apparently when post 2 was put in Feature 59, displacing the atlas and mandible, it also damaged and displaced the maxillary teeth. Their removal from their sockets and their dispersal are further evidence that F had decomposed to some extent and the pit was still open at that point.

Oral Health. Four of the seven Feature 59 individuals suffered from some form of dental pathology (Table 2). The three youngest (D, E and G) were free of problems. Individuals D and E, both about 1.5-1.8 years of age, had fully erupted deciduous teeth but had probably not been weaned. Katzenberg et al. (1993), using ratios of stable carbon and nitrogen isotopes, suggest that weaning among the Ontario Iroquoians of the MacPherson site did not generally occur until two or more years of age. If Western Basin peoples followed a similar practice, individuals D and E would have been insulated from the risk of pathology presented by the adult diet.

At the advanced age of 50-70 years, individual A’s high levels of dental pathology are not surprising: 7 teeth with caries, 2 sites with antemortem loss, and 6 sites with abscesses. Only two teeth (LLM1, LRM2) have chips but wear, loss, and destruction by caries have limited observation of antemortem trauma to only eight mandibular teeth.

Table 2: Dental Pathology, Roffelsen Site.

	caries	antemortem loss	abscesses	chips
Individuals A-C, F				
deciduous teeth	9/28	0/29	0/29	2/22
permanent teeth	15/55	2/69	7/67	3/35
Individuals D-E				
deciduous teeth	0/17	0/17	0/17	0/15

Individual B, aged 6-8 years, has 10 carious teeth, 2 chips, 1 abscess and no antemortem loss. Individual C, 3-4 years old, has 5 caries and 1 chip but no antemortem loss or abscesses. The only dental lesions of individual F are two caries.

Since dental pathology is age progressive and this small series includes a very wide age range, summary statistics must be treated with caution. Nevertheless, the Roffelsen people apparently suffered a rather high level of caries (Table 2). In individuals A-C and F the frequency of caries is 27.3 % in permanent teeth and 32.1 % among deciduous teeth. Dental trauma is low (8-9 %) and consists of chips, not fractures. This suggests that the two cases of antemortem loss in individual A were probably the result of caries rather than trauma (e.g. Lennox and Molto 1995:26). His numerous abscesses indicate that several more of his teeth were also at risk of loss.

In both the permanent and deciduous dentitions most caries are located on the posterior teeth, particularly the premolars and first molars (Table 3). They are distributed relatively evenly between the maxilla and mandible in the deciduous teeth, but are more common in the maxilla among the permanent teeth. All of individual A’s abscesses and one of his two cases of antemortem loss are also on the maxilla.

Table 3: Caries Distribution.

	incisor	canine	premolar	molar 1	molar 2	molar 3
deciduous teeth, maxilla	2	1		1	0	
deciduous teeth, mandible	0	0		4	1	
permanent teeth, maxilla	0	2	6	2	0	0
permanent teeth, mandible	0	0	1	0	4	0
total	2	3	7	7	5	0

The dental pathology of the Roffelsen individuals indicates a diet characterized by high carbohydrate levels but little abrasion, in Ontario usually associated with a considerable reliance on maize (Patterson 1984). Also, the stable oxygen and nitrogen isotopes of a bone sample from individual A suggest high maize and fish consumption (Christine D. White, personal communication, 2006). The Roffelsen caries frequency is somewhat higher than that of the later Springwells phase E.C. Row site (Lennox and Molto 1995:25-26). It is more comparable to those of some Middle and Late Ontario Iroquoian sites, also somewhat later in time (Crinnion et al. 2003).

This apparently high level of maize consumption at Roffelsen, early in the Younge phase, is at odds with our general understanding of the Younge phase subsistence system. Younge phase people are viewed as non-sedentary, following a hunting, gathering and fishing lifeway with some minor maize cultivation (Murphy and Ferris 1990:244; Ferris and Spence 1995:109, 114). A fuller commitment to maize was not thought to have developed until the following Springwells phase. However, the Roffelsen people may simply represent a localized anomaly within a larger pattern of subsistence variability, with different groups in different environments adapting to horticulture in varying degrees. The Thames River environment of Roffelsen would certainly offer no obstacle to an increased reliance on maize. In fact, there is no reason to believe that this could not have been accommodated within a settlement/subsistence pattern that involved some mobility and a continuing interest in hunting, gathering and fishing. As noted above, the nitrogen isotopic content of the individual A sample indicates a high level of fish consumption.

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Using Magnetomer Survey to Locate Buried Cultural Features on Lithic Scatters: Examples from the Davidson (AhHk-54) Late Archaic Site

By Christopher Ellis, Edward Eastaugh and James Keron

Introduction

In this paper we review preliminary efforts to test the utility of magnetometer surveys to locate subsurface feature remnants on ploughed lithic scatters at the Davidson (AhHk-54) Late Archaic site. Since 2006 Ellis had directed fieldwork at this site, work that is beginning to reveal a formerly hidden Archaic world that had not been previously suspected (Eastaugh et al. 2013; Ellis 2006, 2007, 2008, 2010, 2011a, 2011b, 2013a, 2013a, 2013b, 2014a, 2015; Ellis et al. 2009a, 2010, 2011, 2014a, 2014b, 2015; Keron 2015; Malleau 2015). Several techniques have been used to document and explore that world including many controlled surface collections, test pitting, soil probe coring, larger scale excavations and of course, geophysical surveys that are the focus of this paper.

The Davidson is located on the east bank of the Ausable River, some 12 km inland from the Grand Bend on Lake Huron (see Keron and Ellis [2016: Figure 1] and Figure 1 below). The site is predominantly a Late Archaic one with two major components representing the Broad Point Archaic and the Terminal or Small Point Archaic (see Ellis et al. 1990, 2009b; Kenyon 1989). Avoiding details, the large series of AMS radiocarbon dates on the site suggest Broadpoint producing peoples used the site from ca. 2300-2100 BC and then, after about a 600-700 year hiatus, the site was reused by people making Smallpoints of the Innes, Crawford Knoll and related types between ca. 1400 and 1000 BC. Subsequent to that use there are ephemeral traces of site visits in the Early, Middle and Late Woodland as demonstrated by the odd later diagnostic.

Fieldwork at the site to date has demonstrated that it currently covers at least 1.9 ha (Figure 1) although old aerial photos do suggest some of the site along its southcentral margin has been lost to erosion along the river bank (see also Kenyon 1978, 1979, 1980a) and there may be areas deeply buried on the site's southwestern margin nearer the river (Ellis 2015). Much of the site and deposits are encompassed, except for deeper feature bottom remnants, in the cultivated zone of a field. An exception is a substantial area along the northwestern margin of the site where the occupations are in an old buried soil (paleosol) buried up to 1.5 m deep below the modern ground surface. This old surface was buried by European age deposits left by overbank flooding of the adjacent Ausable. The old paleosol is buried deeply nearer the river but gradually slopes up to the east into the ploughed field where artifacts begin to appear on the surface. The completely or partially intact paleosol covers 3600 m^2. It was the exposure of this paleosol in the riverbank by a major erosional event in the late 1970s that led to the initial salvage excavations and reporting of this site by the late Ian Kenyon (1978, 1979, 1980a, 1980b).

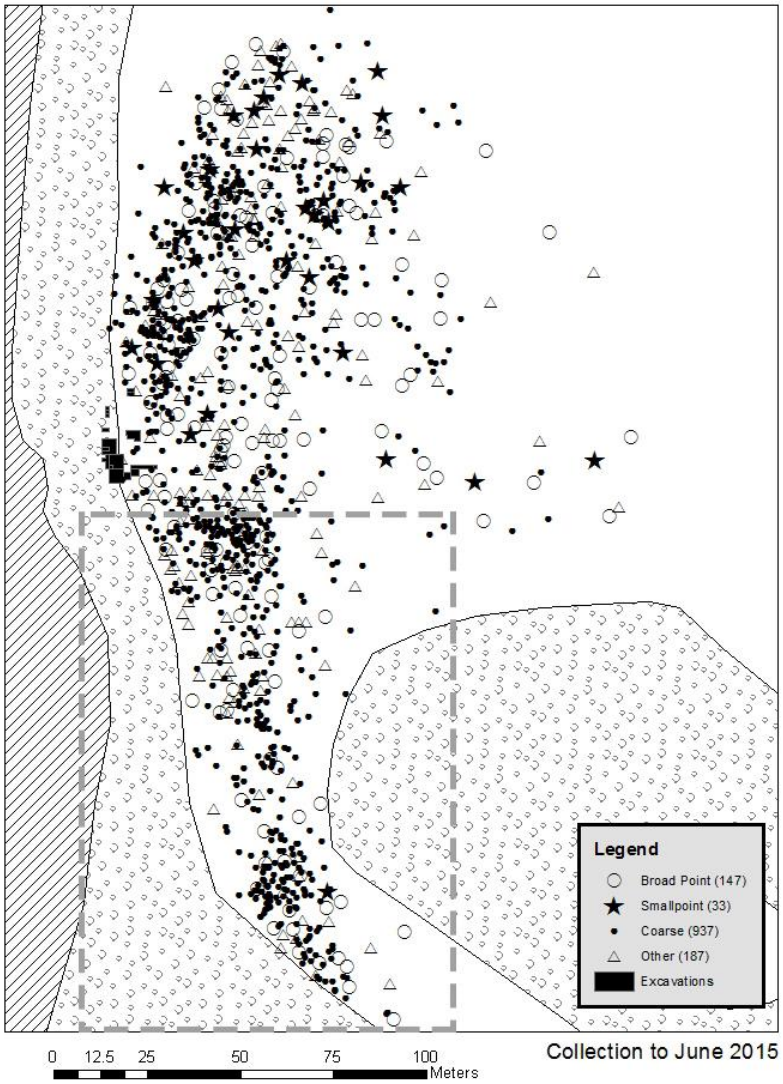

Figure 1: Excavated Area and Surface Finds, Davidson Site. Dashed line outlines southern portion of site shown on Figure 5 below.

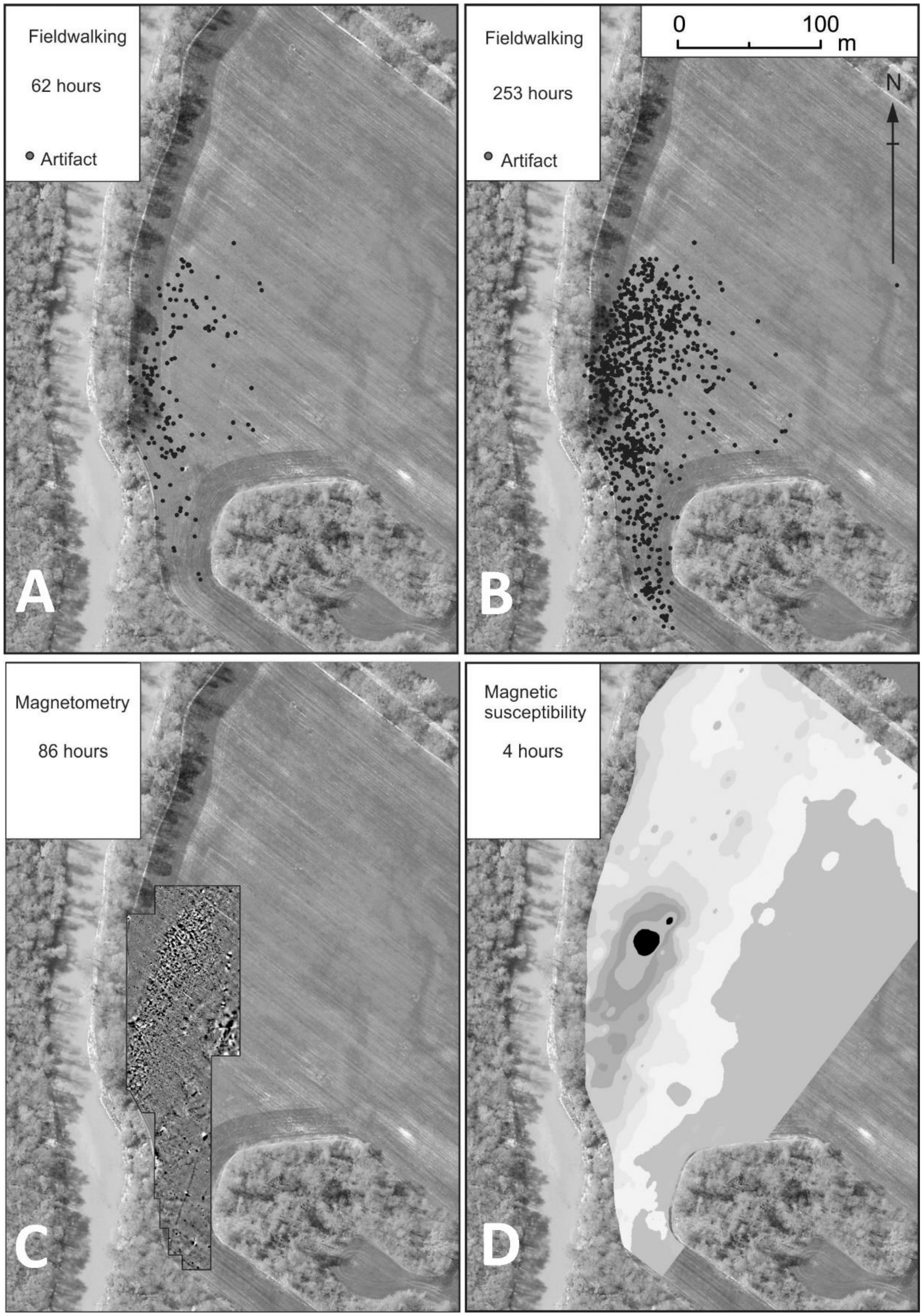

Figure 2: Maps Showing Surface Finds (A-B), Magnetometer Survey Anomalies (C) and Magnetic Susceptibility Survey Readings (D). Length of time to carry out the mapping is also shown in person hours to stress that the geophysical surveys, comparatively speaking, require little time to execute.

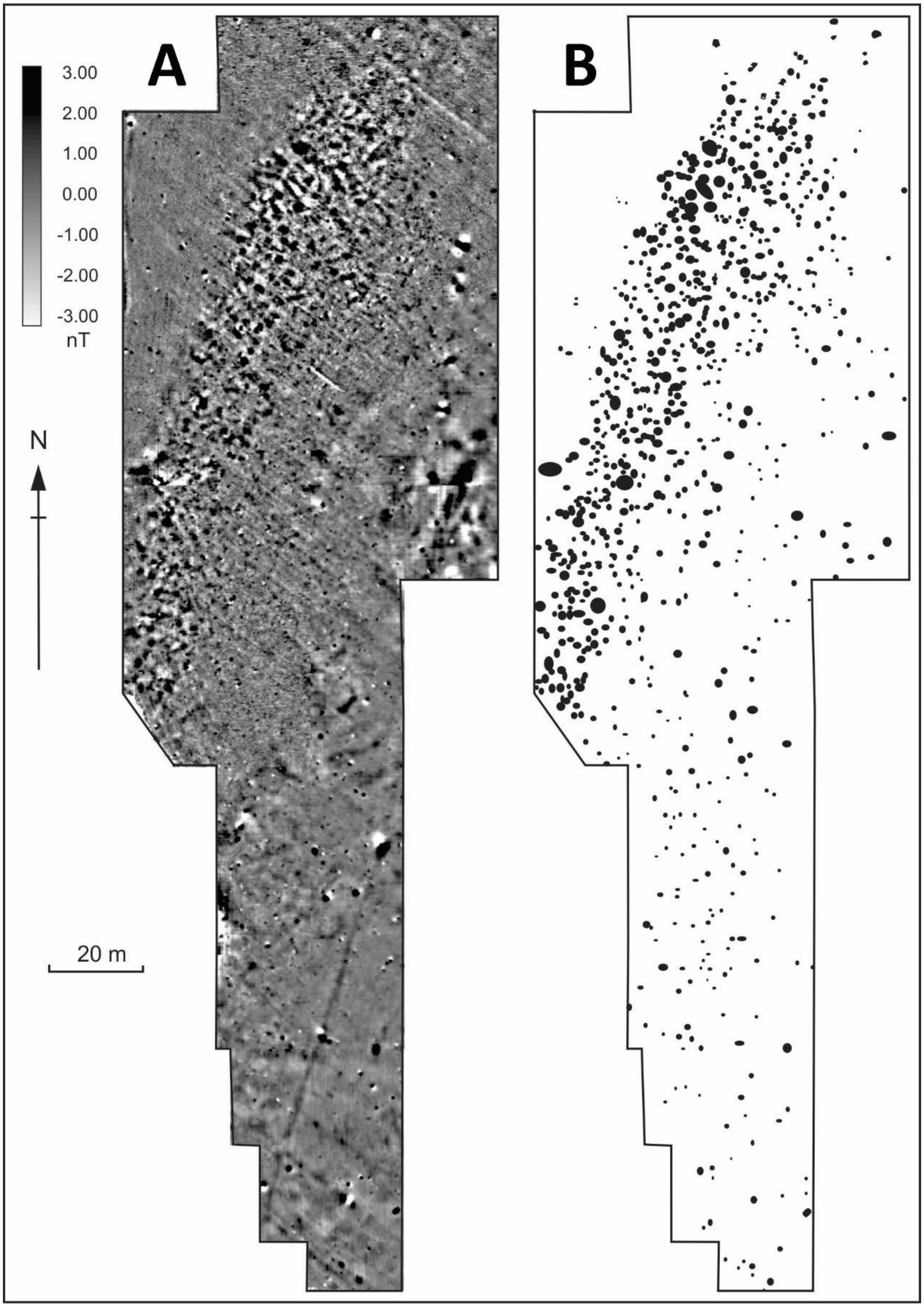

Figure 3: Magnetometer Survey Raw Data Results (A; darker areas represent positive magnetic anomalies) and Magnetic Anomaly Interpretive Results/Suggested Feature Locations (B).

Our work also has shown that the Broad Point Archaic component covers the whole known site area. However, diagnostics of the later Small Point Archaic component are restricted almost exclusively to the northern part of the site in both the ploughed field and areas of excavated buried deposits (Figure 1). In that same area there is a dense linear band of positive magnetometer anomalies (and a major magnetic susceptibility hotspot –see Figures 2 & 3), apparently lining an old river course. Excavations have shown the magnetometer anomalies all represent significant cultural features such as pithouses, hearths and pit clusters and the magnetic susceptibility hot spot coincides with the dense overall linear concentration of such features. Given that their main distribution coincides with the Small Point diagnostics, they seem to be features largely associated with the Small Point component. Such a viewpoint is confirmed by the high frequency of definitive Small Point features in the excavated area (Eastaugh et al. 2013).

On the southern half of the site in the cultivated field area there are no buried deposits with the occupation surface encompassed completely in the ploughzone. Surface finds include almost exclusively Broad Point diagnostics such as points, preforms and flakes on coarse-grained rocks. As originally argued by Kenyon (1980a, 1980b), the lower Ausable lacks sources of cherts which occur in large masses suitable to make the large Broadpoints. As such, and unlike other Archaic peoples, they often turned to making their bifaces from the flakeable, but coarser-grained and more local, rocks such as sub-greywacke and siltstone. Overall, there is much less debris in this southern half of the site and it approximates more closely the normal Archaic lithic scatter/site. Spatial analyses by Keron (2015; see also Ellis et al. 2014a, 2014b) confirm that the Broad Point materials form three statistically recognizable clusters of about the same size, shape and spacing in the southern half and at least three to four other such clusters are found in the northern half coinciding with the main area of subsequent Small Point Archaic activity (Figure 4). The similar size and spacing between such Broad Point clusters may suggest they were used at the same time and that each cluster represents perhaps a different social unit such as an extended family. If so the site could be an aggregation site where seasonally normally small dispersed groups got together to share information, personnel and experiences – an explanation which may explain why this site and other Broad Point ones in the area are so spatially large. It is notable that there are some magnetometer anomalies in these southern Broad Point artifact clusters, albeit much rarer and smaller than the dense anomaly band associated largely with the later Smallpoint component in the northwest area of the site. These anomalies suggest some Broad Point feature remnants may be present in those areas, albeit truncated by ploughing.

The 2014 Fieldwork

A major, but not only, goal of the 2014 fieldwork was to test if the magnetometer anomalies in the southern Broad Point surface clusters were cultural features via targeted, limited excavations. We know it can locate substantial features such as houses, middens or large pit clusters in more buried areas of the site (e.g., Eastaugh et al. 2013) but how good is the technique for locating smaller more ephemeral and often plough-truncated features that are the most characteristic type generally on Archaic sites? In terms of the Davidson site itself, as noted, most features in areas excavated to date are Small Point rather than Broad Point. Hence, and if successful, the planned work could increase our sample of Broad Point cultural features from the site and their contents used to explore more fully exactly how the site was being used by these peoples. Also, they could potentially yield dateable materials that could be used to see how the Broad Point features in the area compare in age to those in the other excavated areas nearer to the river where all other dates were obtained. For example, since it is often argued Ontario Broad Point materials cover a wide time range from ca. 4000-3400 RCYBP (e.g., Ellis et al. 2009), are the occupations in the southern half area the same age as the Broad Point occupation near the river in the northern half or mainly early in that range. If they are not then the idea all the Broad Point site clusters were all used about the same time would have to be rejected.

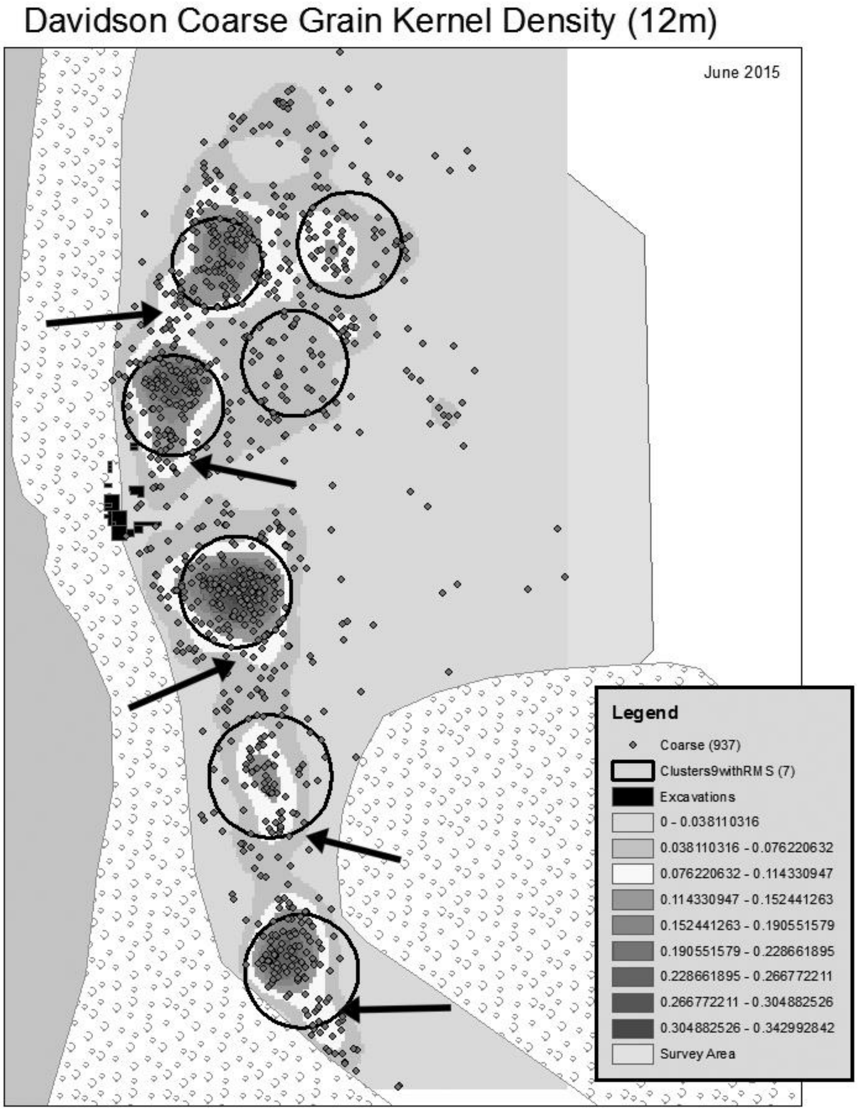

Figure 4: Statistically Isolated Clusters of Broad Point Archaic Waste Flakes on Sub-greywacke and Other Coarser-Grained Rocks. Arrows emphasize that each of the densest clusters are of similar shapes with extensions extending to the south.

We conducted the magnetometer survey with a Bartington Grad 601 twin array magnetic gradiometer. Readings were logged every 12.5cm along traverses oriented North-South and spaced 25cm apart. Results were processed in Geoplot 3.0 to produce the grey scale plots presented here. Two small areas encompassing some anomalies were selected in the southern site clusters for actual excavations. The northernmost of these areas (see Figure 5) was located in the northernmost of the three surface clusters in the southern site half and was called Anomaly Area III (Anomaly Areas I and II were investigated in 2008-2009 in the areas excavated near the river to the northwest; Ellis 2010, 2011a). The second area excavated, called Anomaly Area IV, was located in the southernmost of the Broad Point artifact surface clusters near a wood that borders the southern site margin (Figure 5).

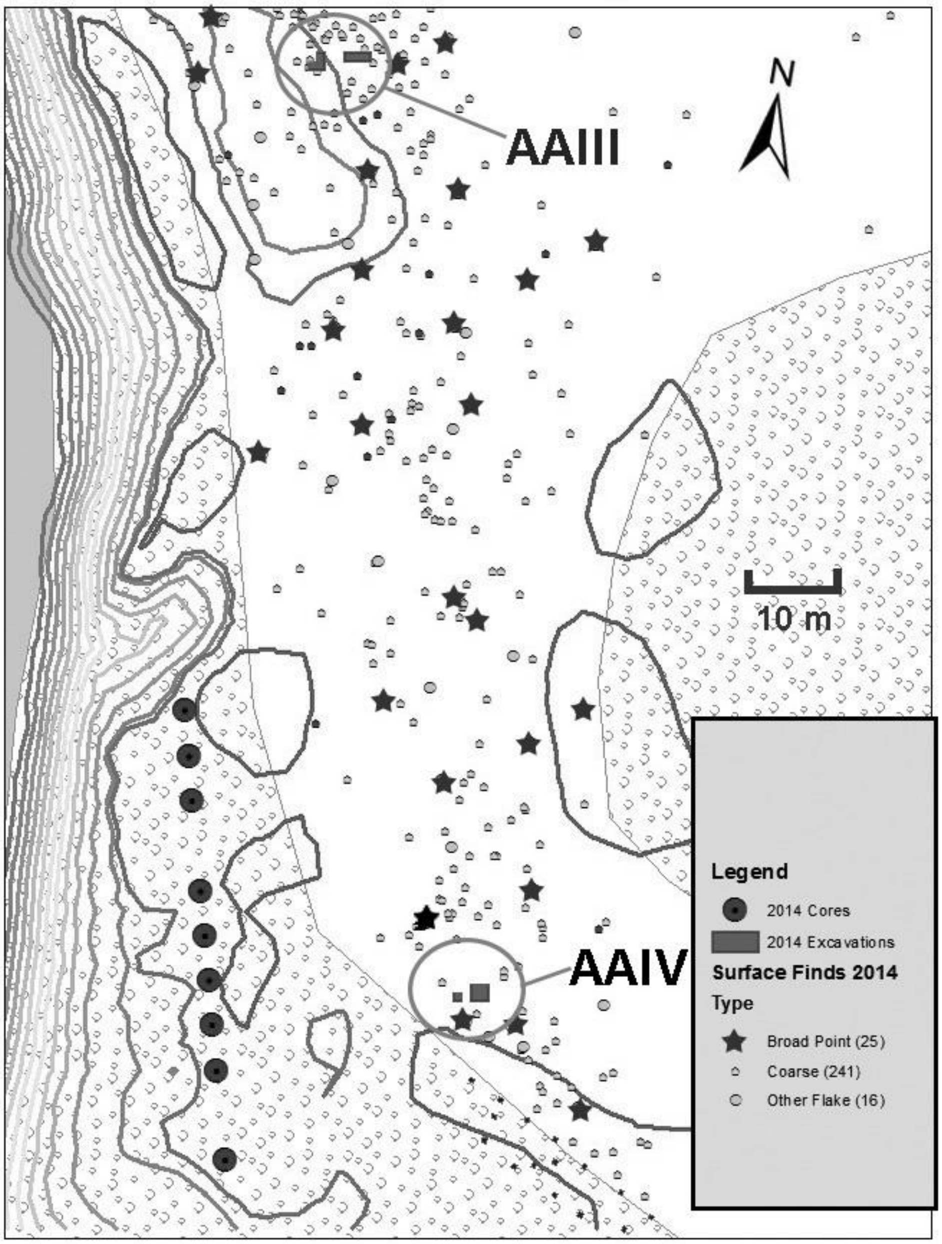

Figure 5: Southern Half of Davidson Site Showing Location of Test Excavated Areas (Anomaly Areas II and IV). See Figure 1 for location of this area in overall site (outlined by a dashed line).

Anomaly Area III

In Anomaly Area III we laid out a grid of three two metre squares arranged west to east, which, in terms of the site grid numbering established previously, ranged from 178-180N and 228-234E (Figures 5 & 6). Following previous excavation and recording conventions at the site (see Ellis 2010), the two metre units were referred to by the grid intersection coordinates at the southwest corners of the squares so the three units initially laid out were 178N/228E, 178N/230E and 178N/232E. As the site was excavated in one metre units, these subunits within the two metre ones were referred by their cardinal position. Hence, the southwestern unit in 178N/228E would be called 178N/228E-SW, the southeastern one metre square in 178N/228E was 178N/228E-SE and so on. The anomalies located in this initially gridded area were essentially threefold and located in squares 178N/228E-SW, 128N/228E-NE and at the eastern edge of 178N/232E-NE (Figure 6). This last anomaly extended to the east just outside of the gridded area.

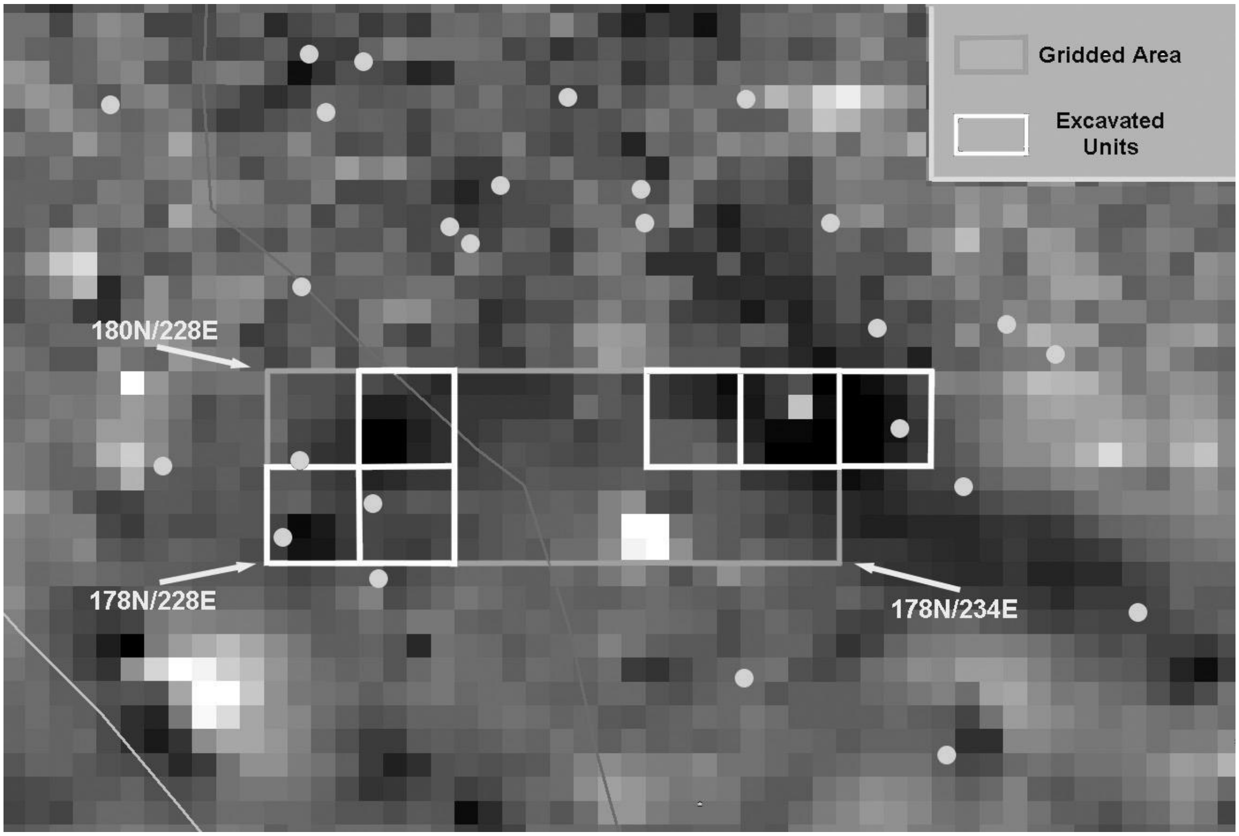

Figure 6: Gridded Area and Excavated Units in Anomaly Area III in Relation to Strong Magnetometer Anomalies (Darker black areas). Circles are surface finds of Sub-Greywacke/Coarse-

Overall, we managed to excavate two three metre square blocks in Anomaly Area III, which encompassed the three anomalies (Figure 6). One block to the west encompassed two anomalies and included one metre squares 178N/228E-SW, SE and NE and the other to the east encompassed 178N/232E-NW and NE as well as 178N/234E-NW. Notably, our surface collections since 2006 prior had mapped the surface location of three metasediment/sub-greywacke flakes in the vicinity of the western anomalies and another three in the vicinity of the eastern anomaly increasing the probability any features present were of Broad Point age. Excavations involved first removing the ploughzone and passing it through 1/4" mesh to recover artifacts. Table 1 lists the ploughzone recoveries from each excavated unit and a notable find is the corner of a Broadpoint stem on Kettle Point chert from square 178N/232E-NW.

Once the ploughzone was removed the subsoil surface was carefully trowelled clean to search for features. If features were found they were cleaned and drawn and photographed in plan and profile view. Half the features were retained as flotation samples. All three of the magnetometer anomalies in this area proved to correspond to actual features (Figure 7).

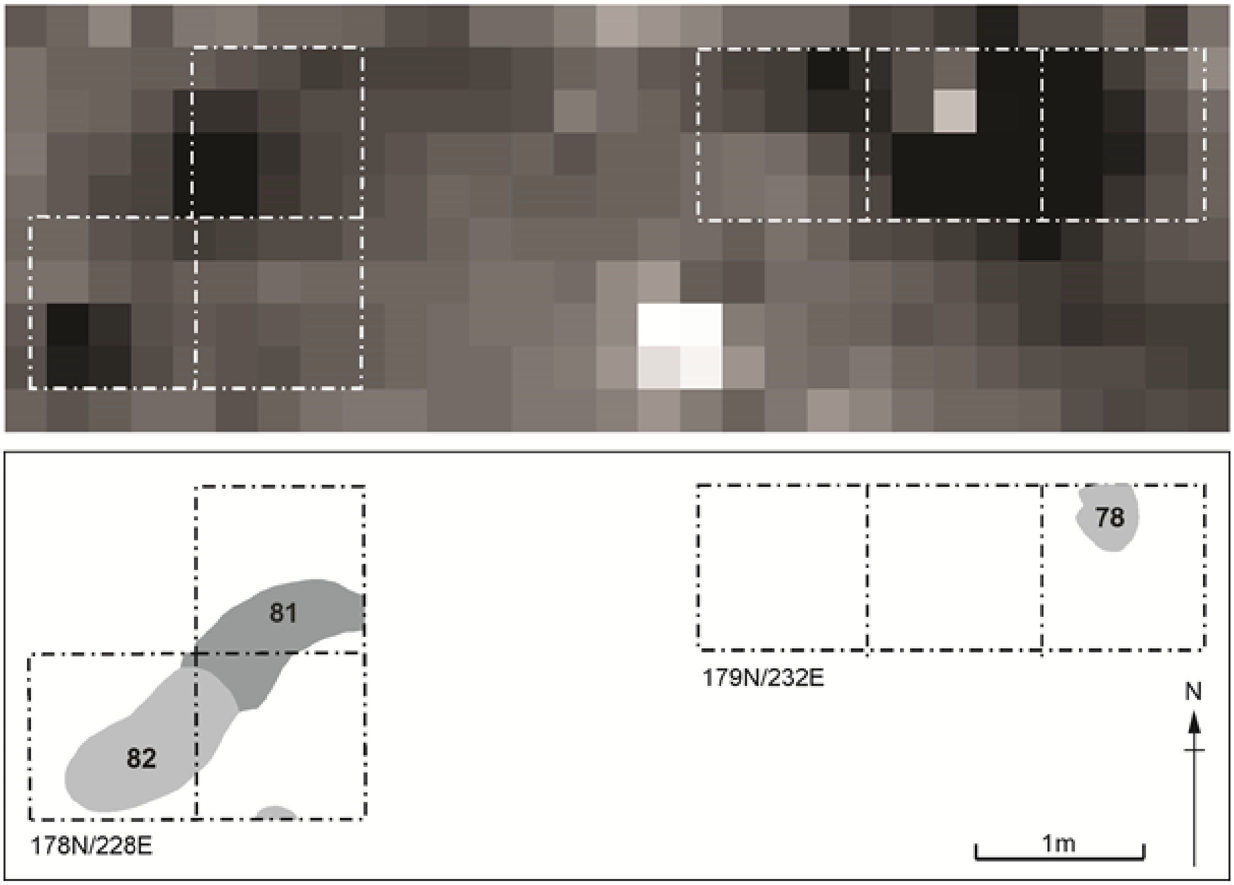

Figure 7: Location of Cultural Features (78, 81, 81) Versus Magnetometer Anomalies, Anomaly Area III.

One feature was in square 174N/224E-NW (Figures 7 & 8) and was assigned Feature #78 (consecutive numbers have been assigned to features since 2008 in the order they are encountered). It was a small oval pit with a dark gray to dark grayish brown (Munsell 10YR4/1-4/2) fill containing some FCR and at least two subgreywacke flakes. The subgreywacke flake suggests a Broad Point association as does the number of subgreywacke flakes in the unit containing the feature (178N/234E-NW) and in the adjacent units to the west (178N/232E-NW & NE) (see Table 1). Also, the point mid-section was recovered in the square two metres to the west (see Table 1). The magnetic anomaly in this areas is somewhat bigger than the preserved feature remnant but it must be realized the magnetometer is actually measuring not just subsoil magnetism but also any in the overlying ploughzone that may contain deposits/sediments spread from such features by cultivation processes. The number of FCR pieces in the area (Table 1) may represent materials spread from the feature by ploughing.

Table 1: Ploughzone Recoveries from Anomaly Area III.

Unit	**FCR**	**Chert Flakes**	**Coarse-Grained Flakes**	**Other Artifacts**
178N/228E-SW	27	47	9	1 bone fragment
178N/228E-SE	36	42	8	-
178N/228E-NE	20	42	7	1 piece historic glass
178N/232E-NW	43	76	5	Broad Point stem fragment
178N/232E-NE	20	89	15	-
178N/234E-NW	30	80	7	1 bone fragment

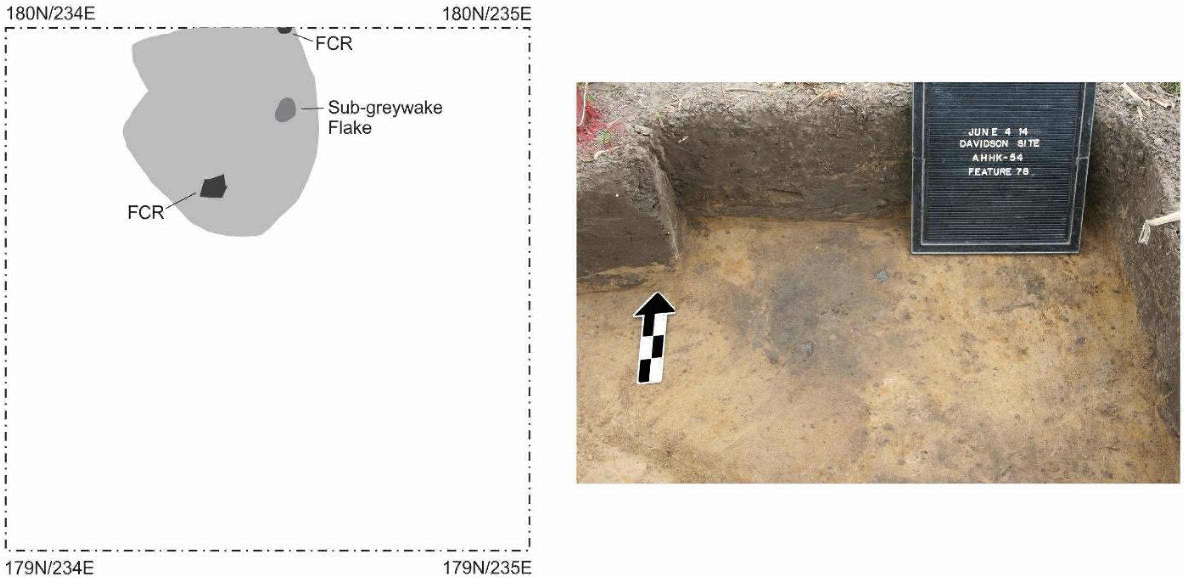

Figure 8: Feature #78, Anomaly Area III.

The two other features in the area were located in 178N/228E in the SW, SE and NE one metre subsquares (Figures 7 and 9) and both were linear pits called Features #82 and #81 respectively. These two linear features actually intersected with the northeast end of Feature #82 overlapping the southwest end of Feature #81. They were both similar in colour (very dark gray; 10YR2/1 in the Munsell soil colour system) so their separation was hard to discern in either plan or profile. It is notable that a subgreywacke flake and a beaver incisor, as well as a Kettle point chert flakes and FCR, were found in cleaning off Feature #82 and two small pieces of charcoal unidentifiable as to any specific taxa were found in the flotation sample (Feature #81 did not yield any floral remains). The subgreywacke flake suggests Feature #81 is a Broad Point age feature. One of the charcoal fragments was submitted for AMS radiocarbon dating and it returned a date of 3750+/-30 BP (ICA 17C/0120; 2145+/-60 cal. BC using Calpal online). Based on a comparison of charcoal and nutshell dates for the Broad Point component at Davidson, the charcoal derived age is probably overestimating the age of the occupation by 100-200 years but nonetheless, the age estimate is perfectly in line with the majority dates from the site in the excavated area suggesting use of this site area at the same time as the clusters nearer the river.

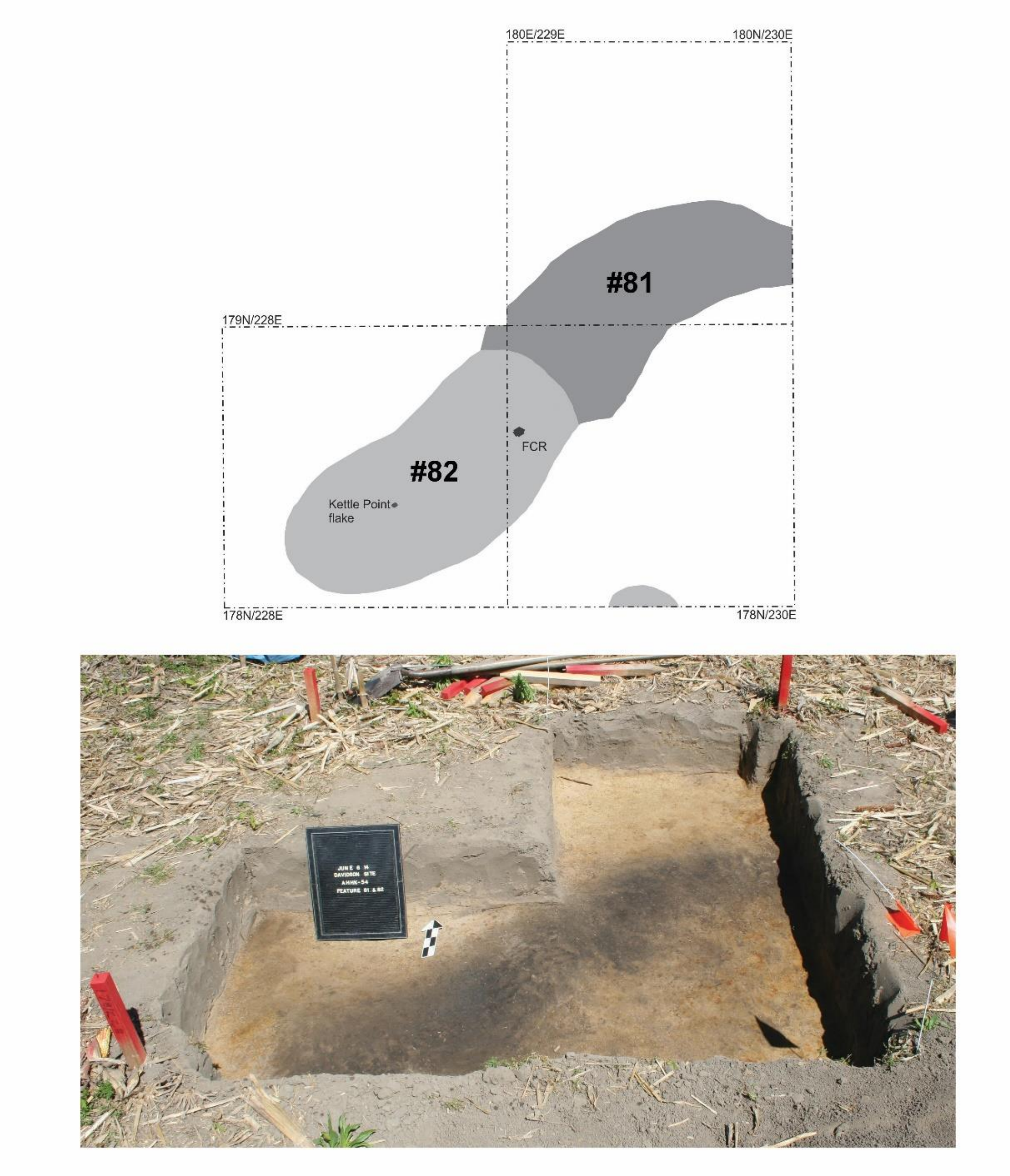

Figure 9: Features #81 and 82, Anomaly Area III.

Anomaly Area IV

In this area we initially laid out a grid of two adjacent two metre squares forming a large rectangle: 74N/246E and 74N/248E (Figure 10). This area would encompass a large anomaly to the east and the edge of two adjacent smaller anomalies at the western margin although another smaller anomaly was just to the northwest. There were fewer coarse-grained flakes in close proximity to the anomalies in this area than was the case in Anomaly Area III but nonetheless, some of these flakes as well as two Broad Point bifaces are found in all directions from the gridded area within about a 10 m radius (see Figure 5). Also, one can never be sure that a surface lithic concentration would actually match the whole activity area or are of concentrated lithic related activities.

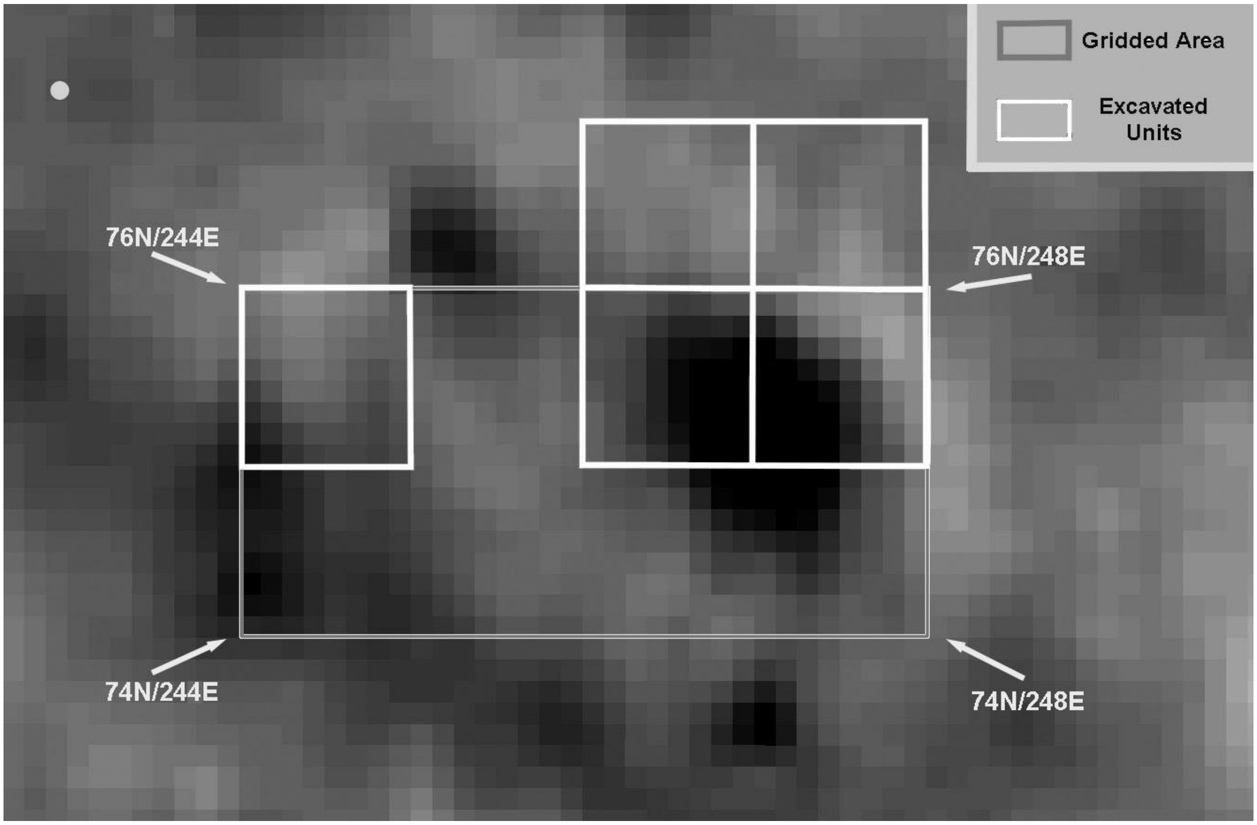

Figure 10: Anomaly Area IV Gridded Area (outlined by grey lines) and Subsequently Excavated One Metre Squares (outlined by white lines) Overlaid on Magnetometer Anomaly Map. Darker areas represent strong magnetic anomalies and circle is a surface find of a coarser-grained flake.

In the end we excavated five one metre units in Anomaly Area IV, consisting of squares 74N/246E-NW and NE, 76N/246E-SW and SE, and 74N/244E-NW (Figure 10). Two of these one metre units extended beyond the northeast margin or the area originally staked out. Excavations followed the same procedure as in Anomaly Area III and material recovered from the screened ploughzone is listed on Table 2 by one metre unit. Unit 74N/244E-NW overlapped slightly the NE corner of the northernmost small anomaly at the west end of the original gridded area but there was nothing to suggest a feature in that area in the underlying subsoil. It is possible that such a feature exists just outside the excavated square and indeed the other definite feature in the area were just north of the locations suggested by the anomaly plots suggesting the original magnetometer survey of this area in 2013 might be offset slightly south from the surface/excavation map grid. A deep (25+ cm) brown (10YR3/1) stain heavily impacted by a deep plough scar was located in the very northeast corner of the same excavation unit. This stain may be the edge of the anomaly suggested to be just northeast of the gridded area (Figures 11 & 12), but no materials were recovered from it to suggest it is cultural. The whole anomaly area would need to be uncovered to determine if this feature is a cultural one. For what it is worth, the square containing this stain yielded more artifacts (chert debris and FCR) than any other one metre unit we excavated in the area suggesting it may be a cultural feature (Table 2).

A definitive cultural feature was found in squares 74N/246E-NW and NE and 76N/246E-SW and SE in Anomaly Area IV. This location to matches generally, albeit slightly north of, the location of large anomaly suggested to be located at the east edge of the gridded area (Figures 10 and 11). Unfortunately, this feature had been heavily impacted on a northwest to southeast axis across its centre by a very deep recent plough furrow (Figure 12). This furrow made it difficult to isolate the southern feature margin and undoubtedly the plough impact had to have spread some feature remnants around the area. The feature was assigned #79 and it overlapped a slightly larger stain on its north that we originally assigned a separate Feature #80 but our excavation suggests that stain is actually a natural tree disturbance.

Table 2: Ploughzone Finds in Anomaly Area IV Units.

Unit	FCR	Chert Flakes	Coarse-Grained Flakes	Other Artifacts
74N/244E-NW	6	25	1	4 historic tile fragments
74N/246E-NW	1	15	3	-
74N/246E-NE	6	15	1	Subgreywacke scraper fragment
76N/246E-SW	9	2	1	rodent tooth
76N/246E-SE	3	9	-	-

In any case, Feature #79 was a pit hearth with a hard, reddened (2.5YR5/8 in the Munsell system) lining underlain by a thin darker (7.5YR2/1) layer (Figure 11). It was not clear whether the hard red layer was a product of deliberately lining the hearth with clay or from simple fire-hardening alone. A small intact core sample was taken with the Oakfield soil probe vertically through this feature and it is being examined in thin section by Dr. Linda Howie of HD Analytical Solutions in London. That analysis, which is not yet completed, may help to unravel exactly how this reddened hearth deposit was formed. The interior/top of the hearth overlying the hard red deposit was filled with a grey black sediment which may be collapsed topsoil. A subgreywacke flake was recovered from this fill and five others were found in the overlying ploughzone of the four one metre units that were excavated. Again, this close association suggests the feature is a Broad Point one.

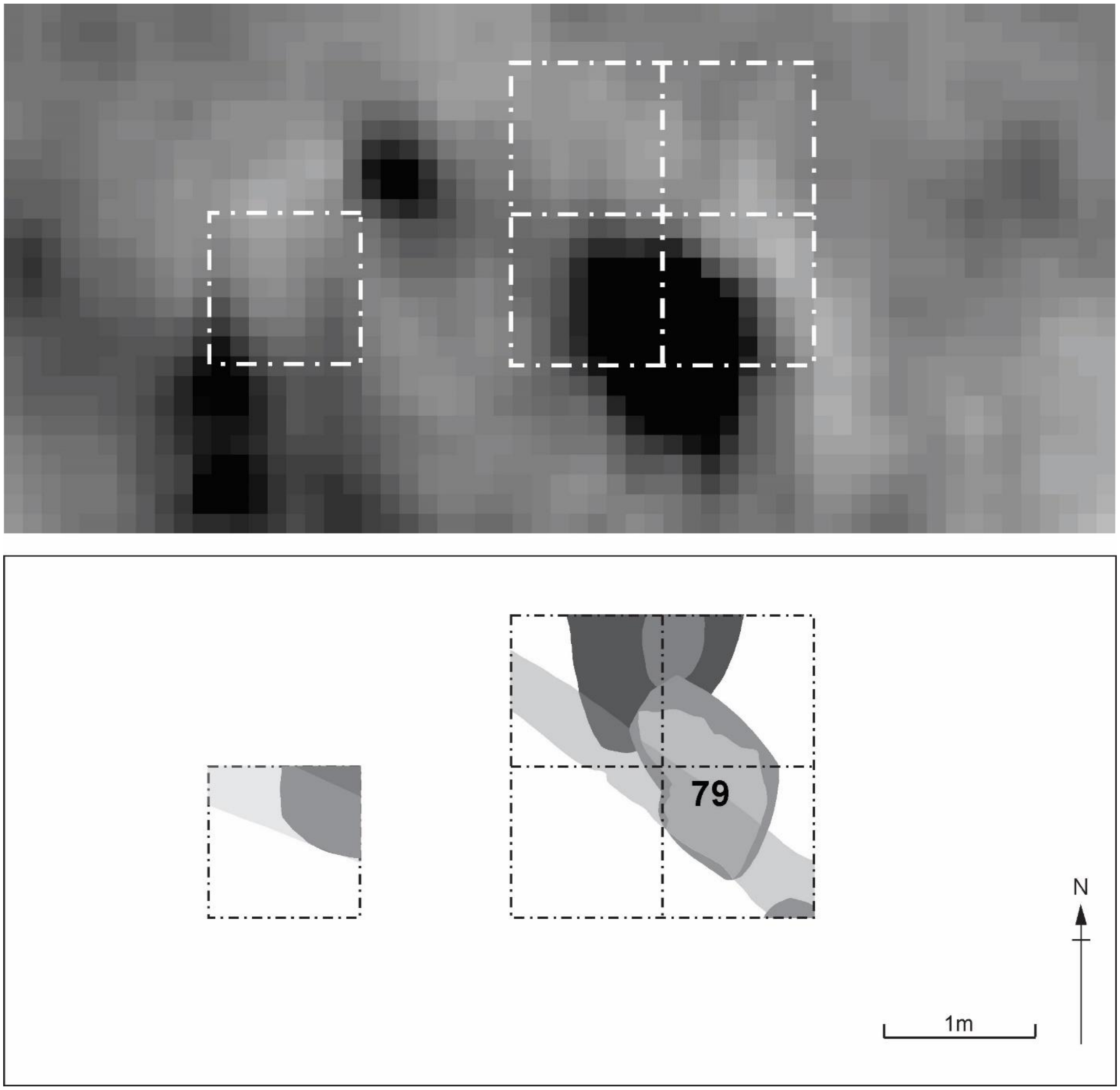

Figure 11: Location of Cultural Feature #79 Versus Magnetometer Anomalies, Anomaly Area IV.

Conclusions

The work carried out here was limited and the sampled areas quite small so it would be good not to overstress the results. More extensive excavation is necessary to demonstrate that such Archaic features are not for example, quite ubiquitous in the area of these surface clusters such that digging anywhere would find one in the vicinity of a magnetic anomaly just by chance. In sum, we only targeted excavation units where we suspected features were present and one needs a more randomly selected sample to assess the results or one would be guilty of the "fallacy of affirming the consequent" (e.g., the answer is contained in the question). Nonetheless, the investigation of the geophysical anomalies in the ploughed southern half of the site did locate cultural features that more or less correspond to the location of those anomalies suggesting magnetometer surveys are useful for locating features on Archaic sites. Moreover, the features located do all appear to be Broad Point Archaic ones, hence increasing our sample of features

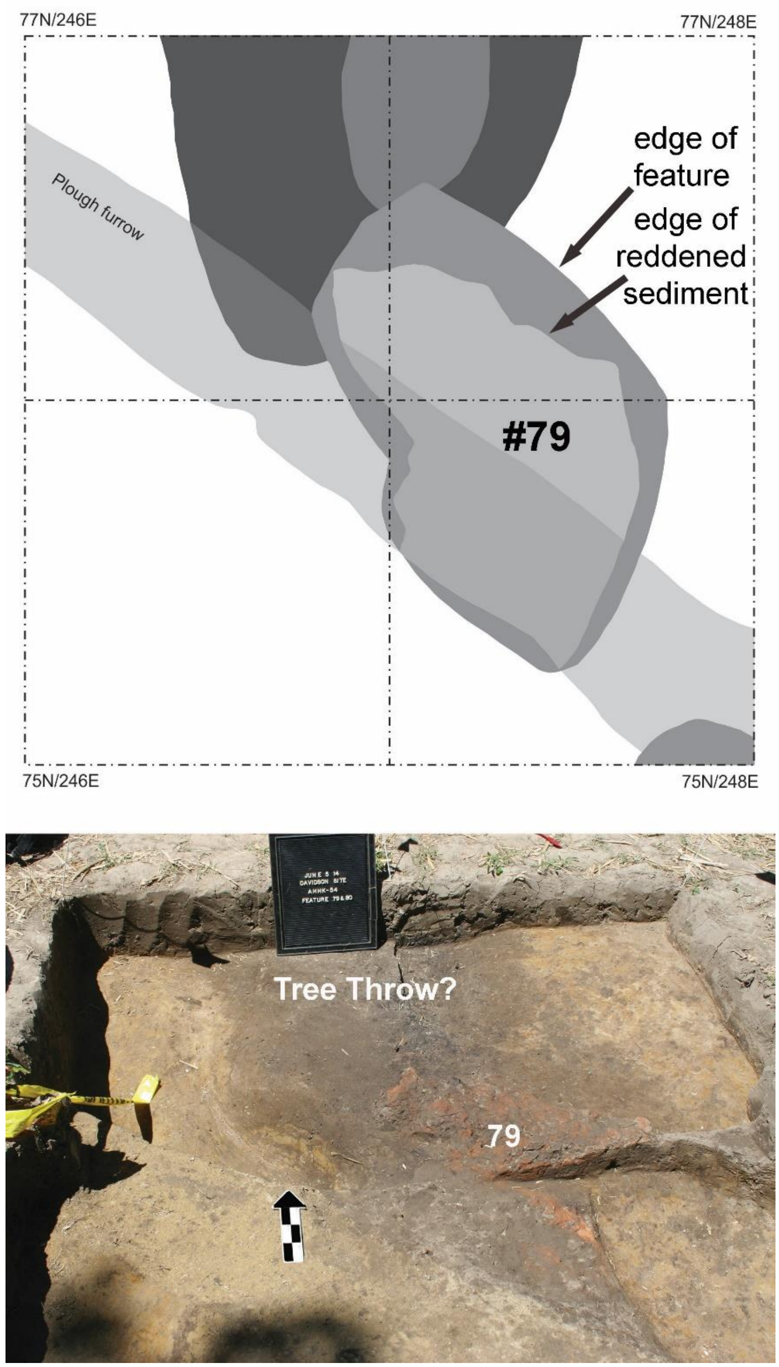

Figure 12: Feature #79, Anomaly Area IV.

representative of that period of site use. One feature even yielded fauna and a radiocarbon date that confirms a Broadpoint time of use of the southern artifact clusters was comparable to that in the excavated areas to the north. We think based on previous research on ploughed Archaic sites where such ephemeral feature remnants are very rarely encountered that one would most likely not hit such an ephemeral definitive feature remnant just by chance. Also, we think it worth stressing that by targeting anomalies one expects to find specific features and these help to ensure an extremely close examination of the subsoil surface and in turn better detection during excavation of ephemeral feature bottom remnants. Too, the features uncovered here, and especially in the south end, were marginal to the denser concentrations of surface debris. Since surface debris often determines where one excavates or tests it raises the possibility one could miss such features during excavations. At the very least, the work at Davidson demonstrates it is worthwhile to carry out and continue to explore the use of geophysical studies on even shallow, more ephemeral "lithic scatters."

Acknowledgments. The 2014 fieldwork at the Davidson site was possible due to the support of several individuals and institutions. First, and foremost I acknowledge the unstinting support of the landowners Mr. Rick Davidson and the late Mrs. Marlene Davidson who gave us unrestricted site access to work on their property. The wholly volunteer field crew included, Chris Dalton, William Fox, Sherman Horn, Kaitlyn Malleau, Lindi Masur, Katie Mather, Larry Nielsen, and field assistants/supervisors James Keron and Darryl Dann. Stephen Moncton examined the feature flotation samples to isolate floral materials and confirmed the charcoal identification of Feature #82. The 2014 work at the site and the radiocarbon dating was supported by a grant from the Social Sciences and Humanities Research Council of Canada (SSHRCC Insight Grant #435-2013-0324 [2013-15]) awarded to Ellis.

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